higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

16 April 2021

This marking guideline consists of 5 pages.

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QUESTION 1

A	B	C	J_A	K_A	J_B	K_B	J_C	K_C	
1	0	0	Ø	0	1	Ø	0	Ø	
1	1	0	Ø	0	Ø	0	1	Ø	
1	1	1	Ø	1	Ø	0	Ø	0	Λ
0	1	1	0	Ø	Ø	1	Ø	0	
0	0	1	0	Ø	0	Ø	Ø	1	
0	0	0	1	Ø	0	Ø	0	Ø	
1	0	1	Ø	0	0	Ø	Ø	1	Λ
0	1	0	1	Ø	Ø	1	0	Ø	

$Q_n \rightarrow Q_n+1$	J	K
0 → 0	0	Ø
0 → 1	1	Ø
1 → 0	Ø	1
1 → 1	Ø	0

	00	01	11	10	
0	1	1	Ø	Ø	Λ
1	0	0	Ø	Ø	

$J_A = /C$ Λ

	00	01	11	10	
0	Ø	Ø	0	0	Λ
1	Ø	Ø	1	0	

$K_A = B\bar{C}$ Λ

	00	01	11	10	
0	0	Ø	Ø	1	Λ
1	0	Ø	Ø	0	

$J_B = A/\bar{C}$ Λ

	00	01	11	10	
0	Ø	1	0	Ø	Λ
1	Ø	1	0	Ø	

$K_B = /A$ Λ

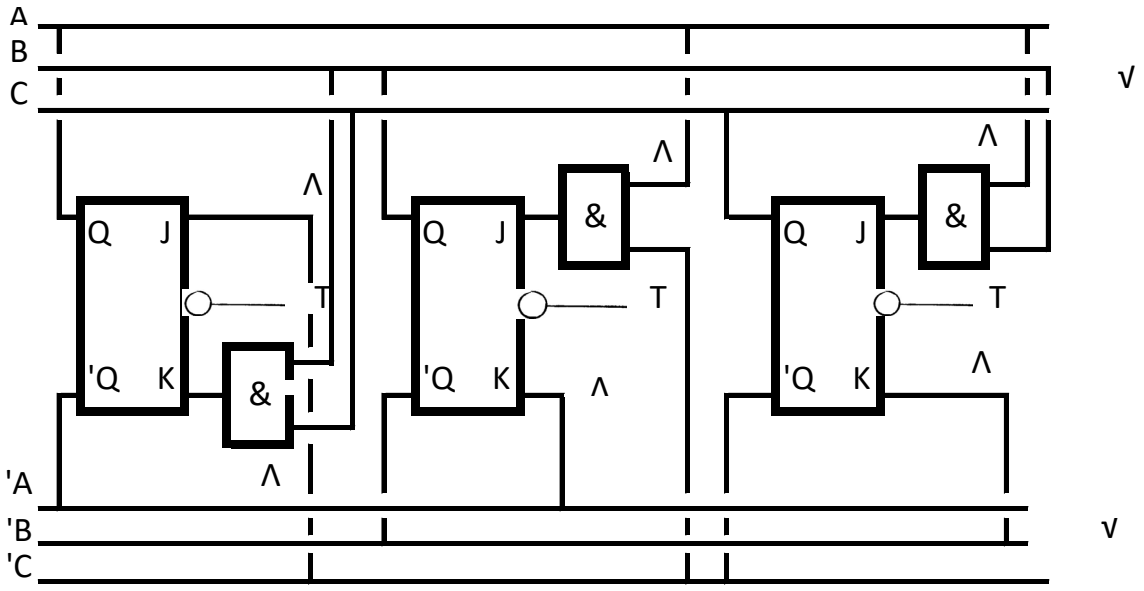
	00	01	11	10	
0	0	0	1	0	Λ
1	Ø	Ø	Ø	Ø	

$J_C = AB$ Λ

	00	01	11	10	
0	Ø	Ø	Ø	Ø	Λ
1	1	0	0	1	

$K_C = /B$ Λ

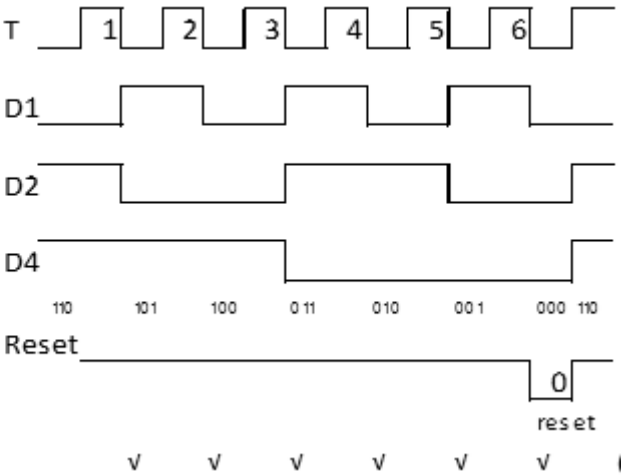
(7)



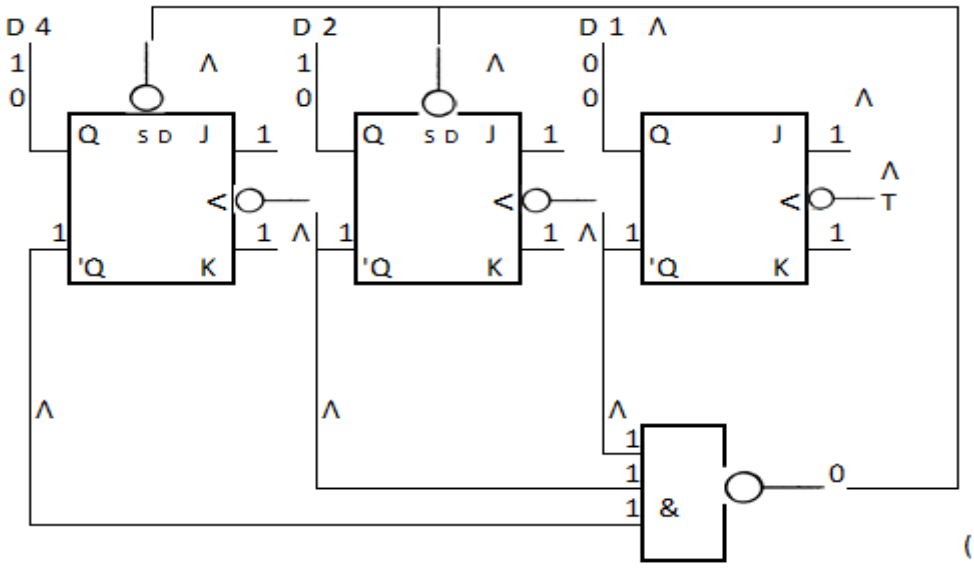
(8)
[15]

QUESTION 2

D4	D2	D1	T	
1	1	0	0	
1	0	1	1	√
1	0	0	2	
0	1	1	3	√
0	1	0	4	
0	0	1	5	√
0	0	0	6	
1	1	0	6	√



√ √ √ √ √ √ (10)



(5)
[15]

QUESTION 3

3.1 one
3.2 several/many
3.3 input/channel
3.4 increase
3.5 several/many
3.6 selecting
3.7 demultiplexer
3.8 switch
3.9 channel
3.10 ring
3.11 sequencer
3.12 transmission

(12 × 1) **[12]**

QUESTION 4

4.1 0001_2 and 1000_2 (2)

4.2

T	D8	D4	D2	D1	D8	D4	D2	D1	
0	0	0	0	1	0	0	0	1	
1	0	0	1	0	0	0	1	1	∧
2	0	1	0	0	0	1	1	1	∧
3	1	0	0	0	1	1	1	1	∧
4	0	0	0	1	1	1	1	0	∧

(2)

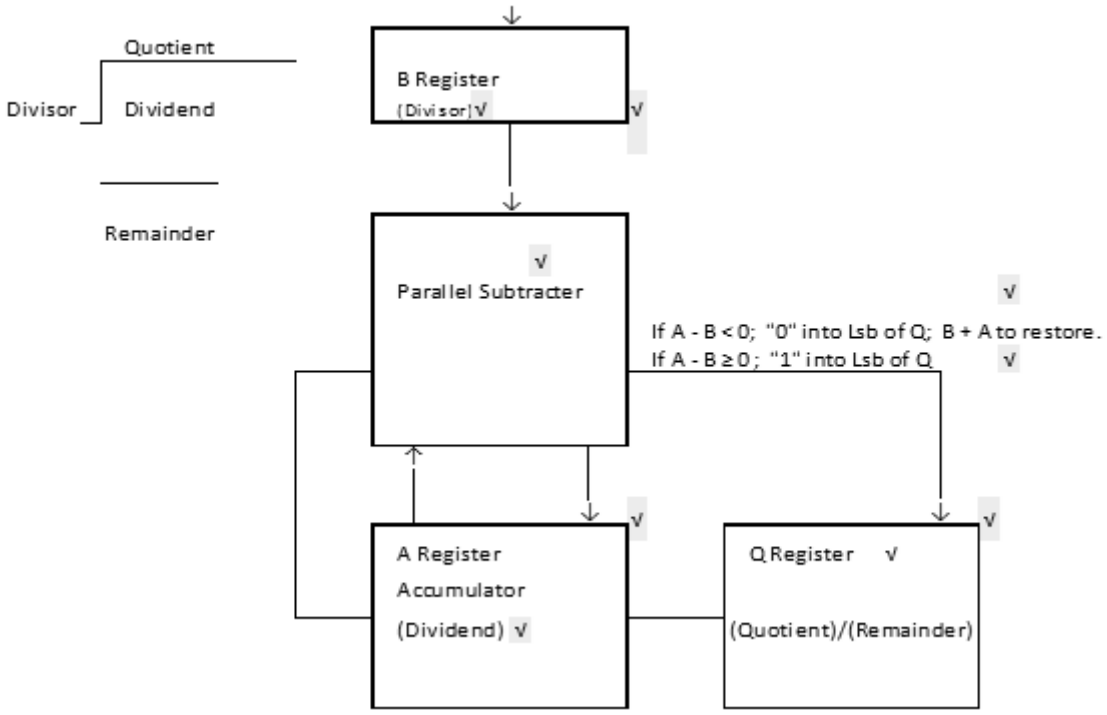
4.3



(9)
[13]

QUESTION 5

5.1



(8)

5.2
- The dividend is loaded in the A register.
- The divisor is loaded in the B register.
- The Q register is set to zero.
- The B register is shifted to the left until its MSB is aligned with the MSB of the dividend in the A register.
- The divisor will be subtracted from the accumulator n + 1 times.
- For every successful subtraction a 1 is saved in the LSB flip-flop of the Q register.
- For each unsuccessful subtraction a 0 is saved in the LSB flip flop of the Q register.
- When all the subtractions have been completed the quotient will be in the Q quotient register.
- The accumulator and Q registers are shifted right until all the quotient bits are removed and the remainder will be in the A and Q registers. (7)

[15]

QUESTION 6

6.1	A, B, C	(2)
6.2	B, C	(2)
6.3	A, D, E, F, G	(5)
6.4	C	(1)
6.5	A, B	(2)
6.6	E, F	(2)
6.7	C	(1)

[15]

QUESTION 7

7.1	7.1.1	False		
	7.1.2	False		
	7.1.3	True		
	7.1.4	False		
	7.1.5	True		
	7.1.6	True		
			(6 × 1)	(6)
7.2	7.2.1	Non-impact		
	7.2.2	Impact		
	7.2.3	Non-impact		
	7.2.4	Impact		
	7.2.5	Impact		
			(5 × 1)	(5)
7.3	Both printers build up its characters as a matrix of dots.			(2)
7.4	Both printers use preformed (complete) characters.			(2)

[15]

TOTAL: 100

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